

-8-

ONS00317
10/072,145

REMARKS

Claims 1-33 remain in the application. Claims 12-25 have been withdrawn in view of a restriction requirement.

By this amendment, claims 1, 5, 9, 10, 11, 26, and 27 have been amended. Applicants' specification including paragraph [0027] together with FIGS. 4 and 6 supports the changes to these claims.

A. Response to 35 U.S.C. §112 Rejection

Claims 1 and 26 were rejected under §112 second paragraph as being indefinite in view of the language "substantially absent." Applicants have amended claims 1 and 26 without prejudice and without disclaimer of subject matter making this rejection moot.

B. Response to First 35 U.S.C. §103 Rejection

Claims 1, 2, 5, 6, 8-11, and 26-29 were rejected under 35 U.S.C. §102(a) as being obvious over Lur et al., USP 5,640,041 (hereinafter Lur). This rejection is respectfully traversed in view of the amendments made herein and the remarks presented hereinafter.

Claim 1 now calls for a semiconductor device comprising a semiconductor substrate having a surface formed with a first recessed region. A first dielectric material is deposited in the first recessed region and formed with a second recessed region having walls. A second dielectric material is formed over the first

-9-

ONS00317
10/072,145

dielectric material by thermally oxidizing a semiconductor cap layer formed above the first dielectric material and adjacent to the second recessed region to seal the second recessed region.

Applicants respectfully submit that Lur fails to make claim 1 obvious because Lur does not show or suggest a process of thermally oxidizing a semiconductor cap layer formed above the first dielectric material and adjacent to the second recessed region to seal the second region. In Lur, there is no semiconductor cap layer shown or suggested adjacent a second recessed region, and Lur specifically uses a deposited oxide for the second dielectric material, which significantly reduces void volume as shown in Lur's FIG. 7, and degrades the resultant dielectric constant.

Applicants further submit that their structure is different and superior to the Lur structure because, as stated in paragraph [0027], the process step recited in claim 1 results in a structure that has, among other things, more gaseous volume, and thus a higher dielectric constant compared to prior art structures such as Lur's.

For at least the above reasons, applicants respectfully believe that claim 1 is now allowable.

Claim 2 depends from claim 1 and is believed allowable for at least the same reasons as claim 1.

Claim 5 depends from claim 1 and further calls for the second dielectric material to be formed by thermally oxidizing a polysilicon cap layer. Claim 5 is believed allowable for the same reasons as claim 1. Additionally, applicants respectfully submit that claim 5 is allowable because Lur does not show or suggest a second dielectric material formed by thermally oxidizing a polysilicon cap layer as called for in claim 5.

Claims 6 and 8 depend from claim 1 and are believed allowable for at least the same reasons as claim 1.

-10-

ONS00317
10/072,145

Claim 9 depends from claim 1 and further calls for a portion of the semiconductor cap layer to remain above the first dielectric material. Claim 9 is believed allowable for the same reasons as claim 1. Additionally, claim 9 is believed allowable because Lur does not show or suggest a portion of the semiconductor cap layer to remain above the first dielectric material.

Claim 10 depends from claim 1 and further calls for all of the semiconductor cap layer to be oxidized to form the second dielectric material. Claim 10 is believed allowable for the same reasons as claim 1. Additionally, claim 10 is believed allowable because Lur does not show or suggest all of a semiconductor cap layer to be oxidized to form the second dielectric material.

Claim 11 depends from claim 1 and is believed allowable for at least the same reasons as claim 1.

Claim 26 calls for a semiconductor device comprising a semiconductor substrate having a surface formed with a first recessed region. A first dielectric material is deposited in the first recessed region and formed with a second recessed region having an opening and walls. A second dielectric material is thermally grown on the first semiconductor layer to form a seal within the opening, wherein the seal is formed by converting at least a portion of a semiconductor cap layer to the second dielectric material, and wherein the semiconductor cap layer is formed adjacent the opening prior to forming the seal.

Applicants respectfully submit that Lur fails to make claim 26 obvious because Lur does not show or suggest a seal formed by a process of converting at least a portion of a semiconductor cap layer to the second dielectric material as set forth in claim 26. In Lur, there is no

-11-

ONS00317
10/072,145

semiconductor cap layer shown or suggested adjacent the second recessed region opening. Lur specifically uses a deposited oxide for the second dielectric material, which fills the recess, and because of its poor step coverage, pinches off to form a seal. Lur's approach significantly reduces void volume as shown in Lur's FIG. 7, and degrades the resultant dielectric constant.

Applicants further submit that their structure is different and superior to the Lur structure because, as stated in paragraph [0027], the process step recited in claim 26 results in a structure that has, among other things, more gaseous volume, and thus a higher dielectric constant compared to prior art structures such as Lur's.

For at least the above reasons, applicants respectfully believe that claim 26 is now allowable.

Claim 27 depends from claim 26 and further calls for the semiconductor cap layer to comprise polysilicon. Claim 27 is believed allowable for the same reasons as claim 26. Additionally, claim 27 is believe allowable because Lur does not show or suggest a polysilicon cap layer as recited in claim 27.

Claim 28 depends from claim 27 and is believed allowable for at least the same reasons as claim 27 and 26.

Claim 29 depends from claim 26 and is believed allowable for at least the same reasons as claim 26.

C. Response to Second 35 U.S.C. §103 Rejection

Claims 3, 4, 30 and 31 were rejected under 35 U.S.C. §103 over Lur in view of Zakeriya et al., US Pub. 2003/0030107 A1 (hereinafter Zakeriya). This rejection is

-12-

ONS00317
10/072,145

respectfully traversed in view of the amendments made herein and the remarks presented hereinafter.

Claims 3 and 4 depend from claim 1. Applicants respectfully submit that Zakeriya does not make up for the deficiencies of the Lur reference as described above in Section B, and that the combination of Lur and Zakeriya fails to make claim 1 obvious for the reasons stated above. Thus, applicants believe claims 3 and 4 are allowable for at least the same reasons as claim 1.

Claims 30 and 31 depend from claim 26. Applicants respectfully submit that Zakeriya does not make up for the deficiencies of the Lur reference as described above in Section B, and that the combination of Lur and Zakeriya fails to make claim 26 obvious for the reasons stated above. Thus, applicants believe claims 30 and 31 are allowable for at least the same reasons as claim 26.

D. Response to Third 35 U.S.C. §103 Rejection

Claims 7, 32 and 33 were rejected under 35 U.S.C. §103 over Lur in further view of Holbrook et al., USP 6,495,853 (hereinafter Holbrook). This rejection is respectfully traversed in view of the amendments made herein and the remarks presented hereinafter.

Claim 7 depends from claim 1, and applicants respectfully submit that Holbrook does not make up for the deficiencies of the Lur reference as described above. Applicants further submit that the combination of Lur and Holbrook fails to make claim 1 obvious for the reasons stated above in Section B. Thus, applicants believe claim 7 is allowable for at least the same reasons as claim 1.

-13-

ONS00317
10/072,145

Claims 32 and 33 depend from claim 26. Applicants respectfully submit that Holbrook does not make up for the deficiencies of the Lur reference as described above in Section B, and that the combination of Lur and Holbrook fails to make claim 26 obvious for the reasons stated above. Thus, applicants believe claims 32 and 33 are allowable for at least the same reasons as claim 26.

Conclusion

Applicants have made an earnest attempt to place the application in condition for allowance. In light of the above amendments and remarks, applicants respectfully request reconsideration and allowance of the pending claims.

If there are matters that can be discussed by telephone to further the prosecution of this application, applicants invite Examiner Magee to call the undersigned attorney at the Examiner's convenience.

Respectfully submitted,

Guy E. Averett et al.



Kevin B. Jackson
Attorney for Applicant(s)
Reg. No. 38,502
Tel. (602) 244-5306

ON Semiconductor
Law Dept./MD A700
P.O. Box 62890
Phoenix, AZ 85082-2890

Date: 9/15/04